

NON-PUBLIC?: N  
ACCESSION #: 9309170119  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: RIVER BEND STATION PAGE: 1 OF 6

DOCKET NUMBER: 05000458

TITLE: MAIN STEAM ISOLATION VALVE CLOSURE & RX SCRAM DUE TO  
SHORTED LEADS (HUMAN ERROR)  
EVENT DATE: 08/10/93 LER #: 93-017-00 REPORT DATE: 09/09/93

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 75

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: David N. Lorfing, Supervisor - TELEPHONE: (504) 381-4157  
Nuclear Licensing

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On August 10, 1993, at approximately 2149 with the plant at 75% power (Operational Condition 1), a personnel error, during "trouble shooting" the operation of the steam bypass & pressure regulating system, initiated a main steam isolation valve (MSIV) closure and subsequently a reactor scram. Investigation into the cause of this transient revealed that an instrumentation and control (I&C) technician was disconnecting a piece of test equipment from a circuit card in the Channel B steam bypass control circuitry. While disconnecting the test equipment, the technician shorted a signal common to +22vdc resulting in the partial loss of power for the steam bypass system. The root cause for this event was that the management policies and expectations were not effectively communicated to the workers, planners and line management. The persons performing the test should have implemented measures to isolate the surrounding work area once they had identified the confined working conditions.

Consistent with strengthening the program for GSU's management policies and expectations, I & C personnel have been instructed that they are responsible for screening the work area for possible unanticipated effects on the plant. Precautions/prerequisites that match the current plant conditions shall be specifically included in MWO test packages. A review of the plant response to this transient indicates that all plant systems reacted as designed. An analysis of the key plant parameters important to plant safety indicates that these parameters remained well within all safety limits.

END OF ABSTRACT

TEXT PAGE 2 OF 6

#### REPORTED CONDITION

On August 10, 1993, at approximately 2149 with the plant at 75% power (operational Condition 1), a personnel error, during "trouble shooting" operation of the steam bypass & pressure regulating system, initiated a main steam isolation valve (MSIV) closure and subsequently a reactor scram.

The plant was being returned to full power operation following forced outage (FO)93-03. At the time of the event, the plant was holding at 75% power to conduct troubleshooting activities on the steam bypass and pressure regulating system. An instrumentation and control (I&C) technician inadvertently shorted two terminals together. As a result, the steam bypass and turbine control valves opened, causing reactor pressure to decrease rapidly. The main steam isolation valves closed as designed on reduced reactor pressure, resulting in a reactor scram. The plant responded as designed to the transient. Pursuant to 10CFR50.72(b)(2) the NRC was notified of the event at 0156 EDT on August 12, 1993.

This report is submitted pursuant to 10CFR50.73(a)(2)(iv) as an unplanned actuation of an engineered safety feature (ESF).

#### INVESTIGATION

The steam bypass & pressure regulating system is designed to control reactor pressure during a reactor heatup and during power operations. The control system is divided into two channels, A and B. Each channel contains most of the control instrumentation necessary to control the steam bypass valves and each channel generates a signal for the main turbine control system. There are, however, some control signals processed for both channels within one circuit card so the channels are

not completely independent. The instrumentation also contains decision circuitry to automatically transfer control between channels if the circuitry detects a fault in the channel that is in control. The circuitry can be overridden by a test switch to allow certain testing of one channel while the opposite channel remains in operation.

During the previous period of operation, it had been noted that turbine control valve testing per Surveillance Test Procedure (STP)-110-0201 resulted in oscillations of a larger magnitude than expected for the control valves. For this reason, some adjustments had been made during the subsequent shutdown to attempt to minimize the oscillations. During the next power ascension, the turbine control valves began oscillating at approximately 75% power, reactor power was reduced slightly to minimize these oscillations. Power was then held at that level to facilitate the

TEXT PAGE 3 OF 6

troubleshooting. With the 'A' channel of the pressure regulating system in control and the test switch in test position to prevent an auto-transfer to the 'B' channel, trouble shooting was being performed on the 'B' channel.

While disconnecting test equipment from a Channel B circuit card, the technician's test lead shorted between two test points on an extender card. Shorting these points together resulted in a circuit breaker opening which de-energized portions of the steam bypass system. This loss of power resulted in the loss of signals to Channel A which was in control of the bypass valves and the turbine control valve circuitry. loss of these signals resulted in both steam bypass valves rapidly opening and the turbine control valves (TCVs) moving slowly to the full open position.

The opening of the steam bypass valves and TCVs at the same time resulted in a main steam line (MSL) pressure drop. MSL pressure decreased to the MSIV isolation setpoint (nominally 849 psig). Closure of the MSIVs with the mode switch in "RUN" initiated a reactor scram, as the system is designed. Reactor pressure was maintained utilizing manual operation of the safety relief valves (SRVs) and reactor level was maintained utilizing the reactor feed pumps (RFP). After the circuit breaker was reset, the MSIVs were reopened and Channel A steam bypass system regained control.

#### ROOT CAUSE

Investigation into the cause of this transient revealed that an instrumentation and control (I&C) technician was disconnecting a piece of

test equipment from a circuit card in the Channel B steam bypass control circuitry. The point to which the equipment was connected (signal common) was approximately 1/4" from the power supply to the circuit card. While disconnecting the test equipment, the technician shorted a signal common to +22vdc resulting in the partial loss of power for the steam bypass system.

Analysis of the work documentation showed no warning of the close proximity of power and common test points. Interviews with the technicians involved revealed that the technicians were not aware that the test point directly above the one they were using was +22vdc power.

The maintenance work order (MWO) being utilized included a caution at the beginning of the work instructions that power should be removed prior to making

any connections. The personnel performing the test, the foreman and test engineer at the work site determined that it would not be possible to do this test without shutting down the turbine. Yet, it was decided that the work instructions allowed the flexibility to perform the steps "live" and they proceeded with the test.

TEXT PAGE 4 OF 6

An inspection of the worksite showed that the circuit cards that were on extender cards were approximately 7 inches from each other. This provided very little room for connecting and disconnecting test equipment.

The root cause for this event was that the management policies and expectations were not effectively communicated to the workers, planners and line management. This is evidenced by the failure to identify and implement the appropriate precautionary measures during the planning, review and performance of this test. The persons performing the test should have implemented measures to isolate the surrounding work area once they had identified the confined working conditions. Taping of the surrounding test points could have accomplished the isolation process.

The test procedure was written to be performed while shutdown. Persons involved in planning and reviewing the MWO should have identified the fact that the initial caution could not be complied with under the current plant conditions. Since the caution could not be complied with, other precautions more appropriate to the current conditions should have been added to the test portion of the work instructions.

The following are contributing factors to this event:

One contributing factor was the lack of worker familiarity with the physical layout of the circuit card under test. The technician was unaware of the close proximity of +22vdc power and common even though the drawing that would have shown this was readily available. If the technician had been familiar with the layout, another test point may have been utilized.

The design of the extender cards presently used places the test points very close together, making shorting of points together likely during disconnecting/connecting test equipment.

The test procedure identified four points that could have been used. The technicians chose to connect two test leads to one test point unnecessarily. This led to the technician having to control one test lead while disconnecting the other.

When interviewed, there was confusion over who was in charge of the test. The personnel performing the test assumed it was the system engineer. The system engineer assumed he was there as a technical advisor.

#### TEXT PAGE 5 OF 6

Prior to restarting the plant it was found that the oscillation problem was caused by improper adjustments on the turbine control valves. The oscillation problem was aggravated by adjustments being performed on the steam bypass and pressure regulating system which made the system respond faster and which intensified the oscillations.

#### CORRECTIVE ACTION

Consistent with strengthening the program for GSU's management policies and expectations, the following actions have been undertaken:

I & C personnel have been instructed that they are responsible for screening the work area for possible unanticipated effects on the plant. Additionally, they have been instructed that they are responsible for any test which they are performing. It is expected that they should have a questioning attitude about any task assigned to them.

Engineering and Planning will be required to ensure that tests to be incorporated into maintenance work orders (MWOs) are thoroughly reviewed. Precautions/prerequisites that match the current plant conditions shall be specifically included in test packages.

The role of System Engineering in troubleshooting is presently being reviewed. This will be determined by September 30, 1993.

The use of an alternate extender card to minimize the possibility of shorting test points to each other is being evaluated.

The Turbine control valves were properly adjusted during the forced outage (FO) 93-03.

Temporary procedure TP-93-0017 was written to perform steam bypass and turbine valve testing. During the power ascension following the scram, the temporary procedure was performed up to 50% power. No oscillations or anomalies were experienced at that time. The plant has since been brought to 100% power without experiencing any further problems with the system.

The following LERs were identified as similar events that have occurred at River Bend Station Unit 1: LERs 89-043, 88-023, 87-014, 86-065 and 85-011.

TEXT PAGE 6 OF 6

#### SAFETY ASSESSMENT

A review of the plant response to this transient indicates that all plant systems reacted as designed. An analysis of the key plant parameters important to plant safety indicates that these parameters remained well within all safety limits.

ATTACHMENT 1 TO 9309170119 PAGE 1 OF 2

GULF STATES UTILITIES COMPANY  
RIVER BEND STATION POST OFFICE BOX 220  
ST. FRANCISVILLE, LOUISIANA 70775  
AREA CODE 504 635-6094 346-8651

September 9, 1993

RBG- 38992  
File Nos. G9.5, G9.25.1.3

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1  
Docket No. 50-458

Please find enclosed Licensee Event Report No. 93-017 for River Bend Station -Unit 1. This report is submitted pursuant to 10CFR50.73.

Sincerely,

J. E. Booker  
Manager - Safety Assessment  
and Quality Verification  
River Bend Nuclear Group

DNL/JPS/FRC/JHM/SRR/kvm

ATTACHMENT 1 TO 9309170119 PAGE 2 OF 2

cc: U.S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011

NRC Resident Inspector  
P.O. Box 1051  
St. Francisville, LA 70775

INPO Records Center  
1100 Circle 75 Parkway  
Atlanta, GA 30339-3064

Mr. C.R. Oberg  
Public Utility Commission of Texas  
7800 Shoal Creek Blvd., Suite 400 North  
Austin, TX 78757

Department of Environmental Quality  
Radiation Protection Division  
P.O. Box 82135  
Baton Rouge, LA 70884-2135  
ATTN: Administrator

\*\*\* END OF DOCUMENT \*\*\*

---